



## Integration between Digital Platforms and Artificial Intelligence Applications on the Development of Engagement Skills in Learning among University Students

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### Abstract

The current research seeks to develop engagement skills in learning and digital trust among university students by designing an interactive e-learning environment based on the integration of the edX Digital platform with some artificial intelligence applications. To achieve this goal, a random sample of undergraduate students at the College of Education, King Khalid University, was selected and divided into two groups: The first empirical group numbered (28) students and used the edx platform with some artificial intelligence applications, and the other empirical group numbered (29) students who used Blackboard platform. A scale of engagement in learning was prepared, and a scale of digital trust, and a “T” test were used to analyze the findings of the research. The study indicated that there is a statistical significance between the integration of the edx Digital platform with some artificial intelligence applications and the Blackboard platform in developing engagement skills in learning in favor of the edX Digital



platform. The findings also indicated that there is no statistically significant difference between the integration of edX Digital platform with some applications of artificial intelligence and the Blackboard platform in developing digital trust skills among students at the College of Education.

**Keywords:** Digital platforms, Artificial Intelligence AI, engagement in learning, digital trust

## INTRODUCTION

Online learning is one of how a teacher can provide interactive educational content to his students, as online learning includes platforms and applications that the teacher can employ and use efficiently in providing participatory educational content characterized by high quality and allowing many students to access the educational content in different places and times according to their circumstances and needs. Interactive educational content can also be recorded and referred to in the future, and then online learning contributes to creating and designing an interactive learning environment that meets the needs of each learner. Due to the great development in the field of the Internet, the idea of widespread Massive Open Online Courses (MOOCs) appeared. George Siemens is the first to coin this term among learners through the course “Connectivism and Connective Knowledge” at the University of Manitoba in (2008 AD). The idea of these courses is based on the philosophy of the Open University and technological platforms. However, the MOOC did not officially start until 2012. When Stanford University launched the first MOOCs in the “Introduction to Artificial Intelligence” course, it attracted more than (160000) subscribers from all over the world [11].

The emergence of open educational courses led to the emergence of many educational Digital platforms that were distinguished by providing educational content in a professional and participatory manner, the most prominent of which are: Coursera, EdX, Udacity, and other platforms. The Arab world was not far from these initiatives. Arab initiatives have emerged to launch open educational courses, the most famous of which are Rwaq and edraak platforms. However, these Arab initiatives differ from their foreign counterparts in that they were not launched by universities, but rather are initiatives of individuals or institutions [5], [3].

[13] Points out that e-learning platforms are based on the foundations and principles of social constructivism theory. They contribute to helping the learner to obtain, generate, or produce the content. They may be built, modified, or adapted by the teacher or learner to support online participation, discussion, and engagement. E-learning platforms are defined as a set of educational services available via the Internet that integrate social networks, and e-learning management systems, they provide teachers, learners, parents, and educational participants with information, interactive tools, and resources to support and enhance educational content for learners through a comprehensive web-based system that uses a secure and easy-to-use interface [12]. In this aspect, [8] focused on designing a Digital learning platform based on



participatory stories and recommended the need to provide Digital platforms to deliver undergraduate courses to encourage students to learn and participate in educational communities across the web. [10] Focused on employing highly polarized open e-learning systems (MOOCs) among university students. The study concluded that the students were able to produce new software that contributed to the design of smart cities for the country in which they live. Many applications rely on artificial intelligence systems and are used in the field of education, including: tracking and extracting educational data to track student behavior, as well as provide support to students at risk of dropping out of their studies. When analyzing a learner's reaction to multiple-choice questions in mathematics, teachers look at the learner's score and grades, while AI applications can delve deeper to learn more about the real difficulty facing the learner, as artificial intelligence applications can determine whether the student suffers from the general concept, or if there is confusion in the question that confuses the student. This means that artificial intelligence applications can identify the basic steps that the student missed and then help him learn the correct way [14].

In this aspect, the study of [17] concluded that chatbots are among the modern applications of artificial intelligence that can be used to provide educational content to students in a fun and attractive way by dividing a single lecture and turning it into a set of interactive questions and including texts, images, videos, and comments instead of writing and presenting the content all at once, which contributes to the existence of adaptive learning specific to each student according to his needs and schedule. As a result of the importance of artificial intelligence applications in the field of education, the study recommended the need to integrate these applications into teacher preparation programs to keep pace with the ever-changing labor market requirements.

[1] Indicated that there is an urgent need to achieve student engagement in studying the courses offered through Digital platforms. Hence, these courses must be based and designed on interaction to ensure the effective participation of students and their engagement and non-dropout, as engagement is one of the important aspects that reduce students' attrition while studying, as the rate of student attrition in courses taught remotely increases by (10-20%) than teaching courses in traditional classes. Therefore, those who teach courses via Digital platforms must pay attention to choosing content and designing activities that ensure the effective engagement of students.

The global reliance on interactive Digital learning platforms in education has led to a major change in the teaching and learning processes. Thus, artificial intelligence and its various applications have become one of the methods that can help in knowing what the learner is doing and what he cannot do. Artificial intelligence applications can also design adaptive Digital content and present it to learners in a smart way, according to their abilities and needs. Hence, artificial intelligence applications help to know the capabilities of each learner and



provide assistance and clarification for any part that is not understood by him. Hence, artificial intelligence applications can help develop the different abilities and skills of the learner with high efficiency.

## RESEARCH PROBLEM

[15] Confirms that educational programs offered by universities do not help students to engage and integrate them. The reason for this is that the educational software template is similar to the educational book template in terms of showing chapters, lessons, and activities to students. Therefore, the study recommended the need to pay attention to designing Digital content that helps students to participate effectively through behavioral interaction, promotes positive emotional responses, and encourages them to respond positively or correctively, among others. [9] Indicates that digital inclusion in the era of distance education is at the heart of learning. Non-engaged students learn less and are often described as “unmotivated”. Many students in virtual learning sessions turn off the microphones and cameras to divert their attention to something else. As a result, there is a gap and a decrease in the academic achievement of students, the basis of which is an engagement gap.

[4] indicates that (90%) of the students watch and read what the teacher publishes on Digital platforms, but they do not participate, comment on it, or integrate from the educational content, and they are called “Lurkers” and (9%) of them participate in the creation of educational content and comment on it, and they publish the content, and they are called “Commenters”. As for the remaining (1%), they are the ones who constantly create educational content and add new elements to it, and they are called “Creators”. Therefore, there is an urgent need to achieve the engagement of students in the courses that are offered via the Internet, so that they are based on interaction, effective participation, engagement, and non-dropout (Abdul Samea, 2019).

[16] Indicates that most students are more interested in the social connections they make through web-based tools and platforms. Although students use these tools daily, educational institutions are still slow to adopt these Digital tools and platforms that may help them integrate into the learning process. Thus, the study of the chef, [6] concluded that students of the Faculty of Education suffer from weakness in the skills of engagement in learning. Therefore, this study recommended the use of digital stimuli to help students develop engagement skills in learning. Al Shaya (2015) indicated that there are some fears and lack of confidence among some users about placing their information and files with the companies providing Digital platforms when the service is subjected to a hacking process. The hacker may be able to obtain users' information, and if the company providing the service resorts to selling or benefiting from your information in one way or another, this will be a real problem. Hence, many users have weak confidence in the services of Digital platforms.





Based on the foregoing, the problem of the current research was identified as “poor engagement skills and digital trust among university students”. Therefore, the current research seeks to remedy this weakness through the integration between the global edX platform and artificial intelligence applications to develop their digital engagement and confidence skills.

## RESEARCH QUESTIONS

The current research attempts to answer the following two questions:

- A. What is the effect of integration between the Digital edx platform and artificial intelligence applications in developing the skills of engagement in learning among students at the College of Education, King Khalid University?
- B. What is the effect of the integration between the Digital edx platform and artificial intelligence applications in developing digital trust skills among students at the College of Education, King Khalid University?

## RESEARCH HYPOTHESES

The current research attempts to verify the validity of the following hypotheses:

- A. H1: There is no statistically significant difference at the level (0.05) between the mean scores of the first empirical group (which used the edX platform), and the other empirical group that used the Blackboard platform in the post-application of the engagement scale in learning.
- B. H2: There is no statistically significant difference at the level (0.05) between the mean scores of the first empirical group (which used the edX platform) and the other empirical group that used the Blackboard platform, in the post-application of the digital trust scale.

## RESEARCH OBJECTIVE:

The current research aims to develop engagement skills in learning and digital trust among students of the College of Education, King Khalid University, through integration between the global edX platform and some artificial intelligence applications.

## RESEARCH SIGNIFICANCE

- A. Directing the attention of university education officials to the need to pay attention to the use of Digital platforms in university education.
- B. Directing the attention of university education officials to the need to pay attention to the employment of artificial intelligence applications in the field of university education.
- C. Encouraging students to self-learn, exchange ideas, and integrate into learning through Digital platform environments.
- D. Directing the attention of those in charge of universities to the need for an educational partnership between the university and the global educational Digital platforms in the field of education, including EdX, Coursera, Udacity, and Future Lean.



## RESEARCH DETERMINANTS

The current research is limited to the following determinants:

- A. Bachelor's students at the College of Education, King Khalid University.
- B. Artificial intelligence applications: Chatbot and Otter Voice Notes
- C. The course "Using computers in education - 424 TRB-2".
- D. Engagement skills in learning: cognitive skills, behavioral skills, and emotional skills.
- E. Digital trust skills: Ease of access - Ease of use - Information quality - Design form - Information security

## DEFINITIONS OF RESEARCH TERMS

### A. Digital Platforms

It is a participatory online learning environment in which artificial intelligence applications can be employed within the content of the "Using Computers in Education" course for students at the College of Education, King Khalid University, to help them develop their digital engagement and confidence skills.

### B. Artificial Intelligence Applications:

They are programs that are offered and integrated with edX platform to help students at the College of Education, King Khalid University, and guide them during their learning of the "Using Computers in Education" course. So that they can integrate into the computer field.

### C. Engagement in Learning

It is the amount of effort that a student takes to process information and individually or collectively participate in the tasks and activities involved in edX platform. Formation of positive tendencies and attitudes toward using the global edX platform, it is measured by the degree that the student obtains on the scale prepared for that.

### D. Digital trust

It is the performance and study of the College of Education's students, King Khalid University, for the course "Using Computers in Education" via the Digital edx platform and some artificial intelligence applications with reassurance without fear because of dealing with this Digital environment with ease and high quality. It is measured by the degree that the student obtains on the scale prepared for that.

## RESEARCH METHODOLOGY

The current research used the quasi-experimental approach based on the design of the two groups with the pre and post-application of performance measures.



## RESEARCH PROCEDURES

To know the effect of integrating edX platform with artificial intelligence applications on developing engagement skills in learning and digital trust among students of the College of Education, King Khalid University, the following was conducted:

### A. First: Selection of the Research Sample

The research sample was selected from the “Bachelor's” students at the College of Education, King Khalid University, in a random manner, which consisted of two groups: The first empirical group, consisting of (29) students, was trained through edX platform through the free account (<https://www.edunext.co>). The second empirical group, a division of (28) students, was trained using the learning management system (Blackboard) available at the university. To ensure the equality of the two groups, the research tools were applied beforehand, and the findings were as shown in Table (1).

**Table 1. Findings of the “T” test in the scale of inclusion in learning and the digital trust scale in the pre-application**

Tool	Group	Mean	SD	Degree of freedom	Calculated T value	Significance level	Significance
<b>Learning Engagement scale</b>	1 <sup>st</sup> empirical group	42.90	3.33	55	1.749	0.848	Not significant
	2 <sup>nd</sup> empirical group	41.36	3.31				
<b>Digital trust scale</b>	1 <sup>st</sup> empirical group	45.10	3.06	7	1.564	0.438	Not significant
	2 <sup>nd</sup> empirical group	43.89	2.77				

Table (1) shows that the calculated (T) value, (1.749), (1.564) in the learning engagement scale, and the digital trust scale, all of which are non-functional, at the level of significance (0.05), the significance of both sides, and the degree of freedom (55). This indicates that there are no statistically significant differences between the two groups in the pre-application of the scale



of engagement in learning and the scale of digital trust, which indicates the equivalence of the two groups.

## **B. Second: Preparing Research Materials**

Designing a learning environment based on the integration of edX platform and artificial intelligence applications:

To design a learning environment based on the engagement of the Digital edx platform with artificial intelligence applications, some previous studies were reviewed, such as:

The study of Al Halafawi, Zaki, and Al Atifi (2017), [2] and the general model of ADDIE design was used as follows:

### **1. The First Stage: Analysis**

At this stage, the following procedures were taken:

- Determining the general objectives of the learning environment based on the engagement of the Digital edx platform with artificial intelligence applications, where the general objective of this environment is to develop engagement skills in learning in (the use of computers in education) among the students of the research sample.
- Determining the characteristics of learners: Seventh-level undergraduate students at the College of Education, King Khalid University, studying the course “Using Computers in Education 424 TRB-2” in the first semester of the academic year (2021 AD), they belong to the same environment with similar circumstances, and their skills in using computers and Internet networks are almost identical. The number of students in the first empirical group was (29) students, and the number of students in the second empirical group was (28) students.
- Educational material: The training content has been identified in the form of (5) training units.

### **2. The Second Stage: Design**

The design stage includes defining procedural goals for the existing learning environment, integrating edX platform with artificial intelligence applications, setting a comprehensive conception of the content, the learning strategy, the various activities appropriate to it, and the evaluation methods, as follows:

A- The procedural objectives of the learning environment based on the integration of edX platform with artificial intelligence applications:

#### **1. First Topic: Digital Platforms**

After completing this content, the student should be able to:

- Discuss the nature of Digital platforms.
- Explain the characteristics of technological innovations.





- Review the most important emerging technologies.
- Discuss the role of emerging technologies in the development of education.

## 2. The Second Topic: Designing Interactive Digital Content

After completing this content, the student should be able to:

- Know the Digital content.
- Define the elements of digital content.
- Employ digital content authoring tools.
- Design digital content according to SCORM standards.

## 3. The Third Topic: Designing Educational Websites

After completing this content, the student should be able to:

- Know what the educational site is.
- Define web design specifications.
- Know the Drupal system for web design.
- Design an educational website.

## 4. The Fourth Topic: Digital Walls

After completing this content, the student should be able to:

- Know about Digital walls.
- Explain the importance of Digital walls in education.
- Design a digital wall.
- Able to publish the Digital wall.

## 5. The Fifth Topic: Words Cloud

After completing this content, the student should be able to:

- Discuss what the word cloud is.
- Conclude the importance of the word cloud in education.
- Design a word cloud in his field of specialization.
- Employ the word cloud in the opinion poll.

The chat bot application was designed through the (Chat fuel) platform. This platform does not require programming experience, but through it, the automated chat is easily designed without any programming experience. The Otter Voice Notes application has also been integrated through the website (<https://otter.ai>) with edX Digital platform.



## B- The learning environment content

The content of the learning environment edX platform with artificial intelligence applications included the following topics:

- The First Topic: Emerging platforms and technologies.
- The Second Topic: Digital content design.
- The third Topic: designing educational websites.
- The Fourth Topic: Digital walls.
- The Fifth Topic: word clouds.

The learning strategy and activities used in edx platform and artificial intelligence applications:

In light of the procedural objectives and the content of the learning environment, the learning strategy proceeded using edX platform by entering the platform and starting to study the content and reviewing the objectives, then studying the Digital content by interacting with the Otter application and the Chatbots application, as well as between the students and the teacher, then the students complete the required project, then it is presented to the teacher in order to obtain feedback. As for the learning strategy through the learning management system “Blackboard”, it is done through students entering the platform, then reviewing the objectives, studying the content, then interacting with each other and between the students and the teacher, then the students complete the required project and then get the feedback figure (2) and figure (3).

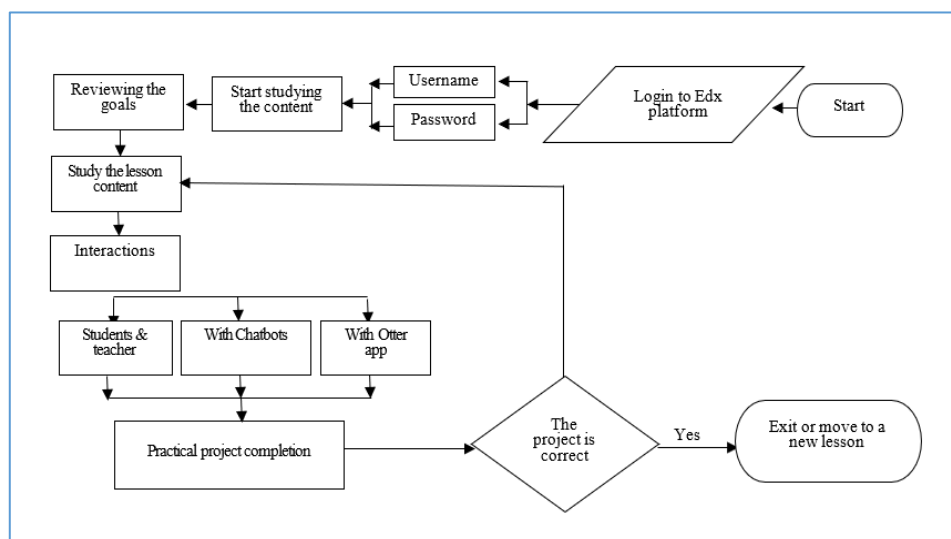
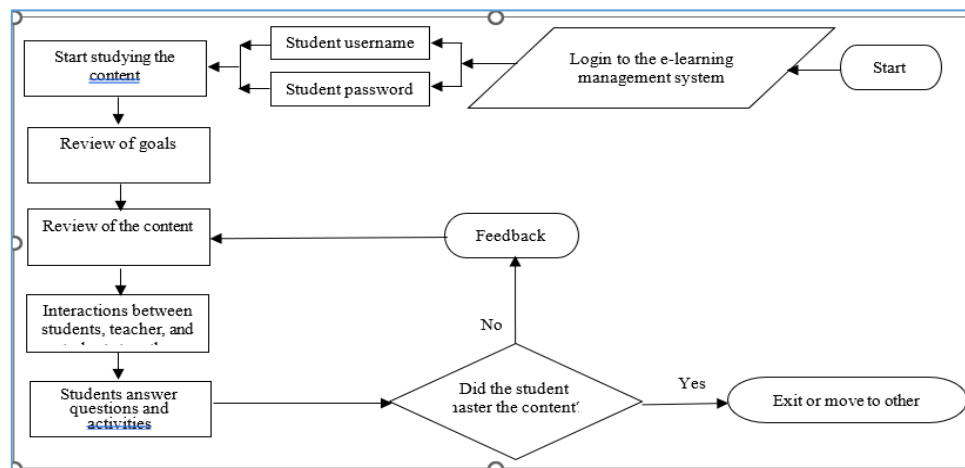


Figure 3. Flowchart of the learning management system “Blackboard” strategy



**Figure 4. Learning strategy and activities followed in the Edx platform and artificial intelligence applications**

### C- Assessment Methods

The assessment methods varied to include the tribal calendar at the beginning of each topic to determine the previous learning, formative assessment during each content to guide student learning and provide feedback and the final assessment, which takes place after completing the study of all training content designed according to the engagement of the Digital edX platform with artificial intelligence applications.

To identify the engagement skills in learning and the digital trust of the research sample.

### 3. The Third Stage: Development

At this stage, the researchers used some programs and applications, the most important of which are the following:

- Blackboard system
- Video Scribe software
- <https://www.edX.org> platform
- <https://answer garden.ch> website
- Articulate Storyline Program
- <https://ar.padlet.com>
- Chat bot application
- Otter Voice Notes application



#### 4. The Fourth Stage: Implementation

At this stage, the Digital content was published on EdX platform, the trial version, and it is available to (50) users. It also explained how to enter the platform and the tasks to be performed.

#### 5. The Fifth Stage: Evaluation:

At this stage, the content of edX Digital platform with artificial intelligence applications was presented to a group of specialists in the field of curricula and “educational technologies”. In addition, the measurement tools represented in the engagement scale in learning, and the digital trust scale were applied, after studying all the training content of the students of the research sample.

##### C. Third: Preparing Performance Measures

- The scale of engagement in learning

The scale of engagement skills in learning was prepared according to the following steps:

- Determining the purpose of the scale

The objective of the scale is to scale engagement skills in learning the “Using Computer in Education” course with its three dimensions, which are: The cognitive dimension, the behavioral dimension, and the emotional dimension using the Digital edx platform integrated with artificial intelligence applications for “Bachelor's” students at the College of Education at King Khalid University.

- Paragraphs of the Scale

The scale consists of three dimensions: the cognitive dimension and the number of its phrases (11), the behavioral dimension and the number of its phrases (9), and the emotional dimension and the number of its phrases (11). Thus, the number of scale phrases became (31) phrases.

- Adjusting the scale through

- Presenting the initial image of the scale to a group of arbitrators: After completing the formulation of the scale's vocabulary, it was presented to a group of specialists in the field of curricula, educational techniques, and psychology. Their opinions explained the appropriateness of the scale for the purpose for which it was set, with the deletion of some phrases of the second dimension of the scale, and the reformulation of some phrases from the linguistic point of view.

- Exploratory application of the scale

After knowing the opinions of the arbitrators, the scale was applied Digital ally through the website <https://cutt.us/Jf7m7> on an exploratory sample of (22) undergraduate students at the College of Education, King Khalid University to identify the appropriateness of phrases from





a linguistic and scientific point of view. Their responses illustrated the appropriateness of the scale statements without any linguistic or scientific ambiguity.

- Internal consistency of the scale (statistical validity)

The correlation coefficient matrix (Pearson) was found between the dimensions of the scale and the total score according to the following table:

Item	Cognitive	Behavioral	Emotional
<b>Cognitive</b>	1		
<b>Behavioral</b>	0.64	1	
<b>Emotional</b>	0.37	0.50	1
<b>The scale as a whole</b>	*0.89	*0.80	*0.68

It is clear from the above that the correlation coefficient of the first dimension with the scale as a whole is equal to (0.89), and the correlation coefficient of the second dimension with the scale as a whole is equal to (0.80), while the correlation coefficient of the third dimension with the scale as a whole is equal to (0.68), all of which are significant and statistically acceptable values. This indicates that the dimensions of the scale the same thing as the scale as a whole, which indicates the validity and dimensionality of the scale.

- Calculating the average time of the scale:

The scale time was calculated by finding the average of all students' times, each according to his speed, and it was approximately equal to (30) minutes.

- Calculating the reliability of the scale:

After presenting the scale to a group of arbitrators and its exploratory testing on (22) students using the (Cronbach's alpha) equation, it was found that it is approximately equal to (0.83), which is an appropriate reliability coefficient.

- The final version of the scale: After formulating the scale and adjusting it statistically, the scale becomes valid for final application.
- Digital trust building scale: The digital trust building scale was prepared according to the following steps:
- Determining the Purpose of the Scale:



The objective of the scale is to provide the Bachelor's degree at the College of Education at King Khalid University with the skills of building digital trust in dealing with digital platforms. The dimensions of the scale are accessibility, ease of use, information quality, website format and design, and information security.

- Paragraphs of the scale:

The scale consists of five dimensions, which are shown in Table (2).

**Table 2. The number of dimensions and items of the scale in its initial form**

S	The Dimension	No. of phrases
1	Easy access to the platform	5
2	Easy use of the platform	8
3	Quality of information on the platform	9
4	Form and design of the platform	6
5	Information security in the platforms	10
<b>Total</b>	5	38

- Setting the scale through: Presenting the initial image of the scale to a group of arbitrators:

After completing the formulation of the scale's vocabulary, it was presented to a group of specialists in the field of curricula, teaching methods, educational techniques, and psychology and their opinions explained the appropriateness of the scale for the purpose for which it was set, with the deletion of some phrases of the scale, with the modification of the wording of some phrases from the linguistic point of view.

- Exploratory application of the scale:

After knowing the opinions of the arbitrators, the scale was applied Digital ally through the website <https://cutt.us/3UIMb> on an exploratory sample of (22) undergraduate students at the College of Education, King Khalid University to identify the appropriateness of phrases from a linguistic and scientific point of view. Their responses illustrated the appropriateness of the scale statements without any linguistic or scientific ambiguity.

- Internal Consistency of the Scale (Statistical Validity):

Spearman correlation coefficient matrix was found between the dimensions of the scale and the total score according to the following table:



Dimension	Ease of access	Ease of use	Information quality	Platform form and design	Information security
Ease of access	1.00				
Ease of use	0.61	1.00			
Information quality	0.57	0.73	1.00		
Platform form and design	0.34	0.67	0.59	1.00	
Information security	0.54	0.49	0.61	0.54	1.00
The entire scale	*0.70	*0.65	*0.80	0.54	0.84

It is clear from the above that the correlation coefficient of the first dimension with the scale is equal to (0.70), and the correlation coefficient of the second dimension with the scale is equal to (0.65). The correlation coefficient of the third dimension with the scale is equal to (0.80), the correlation coefficient of the fourth dimension with the scale is equal to (0.54), and the correlation coefficient of the fifth dimension with the scale is equal to (0.84) as significant and statistically acceptable values. This indicates that the dimensions of the scale are the same thing as the scale, which indicates the validity and dimensionality of the scale.

- Calculating the average time of the scale.

The time of the scale was calculated by calculating (75%) of the students' responses, and it was approximately equal to (50) minutes.

- Calculating the reliability of the scale:

After presenting the scale to a group of arbitrators and experimenting with it on (22) students using the (Alpha Cronbach) equation, it was found that it is approximately equal to (0.86), which is an appropriate reliability coefficient.

- Final version of the scale: After formulating the scale and adjusting it statistically, the scale became valid for final application (Appendix 3).
- Fifth: Pre-application of measurement tools:

The tools of the scale of engagement in learning and the scale of digital trust were applied pre-applied to the two research groups in the first semester (2021 AD).

- Sixth: Implementation of the Research Experiment:

After clarifying the purpose of the experiment, the research experiment was carried out at the College of Education during the first semester (2021 AD), and the number of members of the



first empirical group was (29 students). As for the second empirical group, it numbered (28 students), and the experiment lasted about (6) weeks.

- Seventh: Post-application of measurement tools:

After the completion of the research experiment, the measurement tools represented in: The scale of engagement in learning, and the scale of digital trust in the course “Using computers in education” is a post-application to the research sample, correcting and monitoring it.

### RESEARCH FINDINGS AND THEIR INTERPRETATION

After monitoring the scores of the students in the post-application in each of the scale of engagement in learning, and the scale of digital trust in the course “Using Computers in Education”, the research questions were answered as follows:

The answer to the first question: “What is the effect of the integration between the Digital edX platform and artificial intelligence applications in developing the skills of engagement in learning among the College of Education’s students, King Khalid University?”

To answer this question, formulate the following hypothesis:

There is no statistically significant difference at the level (0.05) between the mean scores of the first empirical group (which used edX platform) and the other empirical group that used Blackboard platform, in the post application of the engagement scale in learning. To test the validity of this hypothesis, the statistical treatment was carried out using the (T) test for two independent samples to compare the scores of applying the scale of engagement in learning for the first experimental or other empirical groups. Table (3) shows the findings of applying the “T” test to indicate the differences between the mean scores of the first empirical group and the other empirical group in the scale of engagement in learning the course “Using Computers in Education”.

**Table 3. The T value and its statistical significance between the mean scores of the students of the first and the other empirical groups in the engagement scale**

Group	Tool	N	M	A	Degree of freedom	T Value	Significance
1 <sup>st</sup> Group	Education engagement scale	29	52.69	4.91	55	*7.923	Significant
2 <sup>nd</sup> Group		28	43.41	4.13	55	*7.923	Significant

Table (3) shows that the calculated (T) value is (7.923), which is a function of the level (0.05), the significance of both sides, and the degree of freedom (55), which indicates the existence of





statistically significant differences between the first empirical group and the other empirical group in the post application of the engagement scale in learning the course “Using computers in education”. Thus, the first hypothesis of the research was rejected, where there is a statistically significant difference at the level of (0.05) between the mean scores of the first empirical group (which used edX platform with some artificial intelligence applications), and the other empirical group that used Blackboard platform, in the post application of the engagement scale in learning, in favor of the first empirical group.

The researchers believe that the previous finding could be due to the following:

- The user interface characterizes the edx Digital platform, including buttons, ease of access, drop-down lists, outgoing and incoming message box, and others. All of this contributed to attracting students and integrating them into learning the content of the computer use course in education.
- Availability of an application of artificial intelligence in edX platform, which is the chat bots, as this application helped in assessing the level of students after they studied the content of the lesson, and then provided the assistance to them in the difficult and incomprehensible parts for them. As a result, the application helped students to get engaged in the learning process by asking questions and getting answers instantly.
- The design, quality, and modernity of the Digital content of the “Using Computers in Education” course, including the implementation of practical projects by students, helped the students' engagement into the learning process.
- Integration of Otter Voice Notes App into edX platform, which is an artificial intelligence application that helps students record information and share it with others, whether by converting sounds into written texts or only audio recordings.
- The basic philosophy of edX platform is based on self-learning through the learner's search for information and the participation of others to exchange information. Then, each student from the research sample was interested in developing his abilities and searching for new things in the field of technology, and then this environment helped to increase the engagement of the College of Education's students into the learning process.
- The integration of edX platform with the Chatbots application represents a personalized learning environment for each learner. Through this application, each learner was able to obtain his needs according to the pre-made answers. In addition, this environment is not linked to a specific place or time, and therefore all students were involved in the learning process in a large way.
- As a result of the students' familiarization in the current era with the means of instant communication platforms, integration of edx platform with the Chatbots application provides this feature for instant communication and immediate feedback, as mobile applications have now become an essential part of every student's life.



- Integration of edx platform with Chatbots application Help students to keep up with their trends and tendencies in real time by using the internet to browse, get knowledge, and instant help, thus helping to engage students in the learning process.

The answer to the second question: “What is the effect of integration between the Digital edx platform and artificial intelligence applications in developing digital trust skills among students at the College of Education, King Khalid University?”

To answer this question, formulate the following hypothesis:

There is no statistically significant difference at the level (0.05) between the mean scores of the first empirical group (which used edX platform) and the second empirical group (which used “Blackboard” platform) in the post application of the digital trust scale. To test the validity of this hypothesis, the statistical treatment was carried out using the (t) test for two independent samples to compare the application scores of the digital trust scale for the first experimental and the other empirical groups.

Table (4) shows the findings of applying the “t” test to indicate the differences between the mean scores of the first empirical group and the second empirical group in the digital trust scale.

**Table 4. The T value of and its statistical significance between the mean scores of the students of the first and second empirical groups in the digital trust scale**

Group	Tool	N	M	A	Degree of freedom	T Value	Significance
1 <sup>st</sup> Group	Digital trust scale	29	66.52	7.05	55	1.368	Insignificant
2 <sup>nd</sup> Group		28	64.04	6.68	55	1.368	Insignificant

Table (4) shows that the calculated value of (t) is (61.368), which is non-functional at the level of (0.05), and the significance of both sides, with a degree of freedom (55). This indicates that there are no statistically significant differences between the first empirical group and the second empirical group in the post application of the digital trust scale in the “Use of Computers in Education” course. Thus, the second hypothesis of the research hypotheses was accepted, as there is no statistically significant difference at the level (0.05) between the mean scores of the first empirical group (which used edX platform), and the second empirical group that used Blackboard platform, in the post-application of the scale Digital trust.



The researchers believe that the previous finding could be due to the following:

- edX platform that includes applications for artificial intelligence, and “Blackboard” platform include an easily and securely accessible link.
- edX and Blackboard platforms provide tools for the user to verify his identity before starting to enter the platform and study the educational content.
- The user in both edX and Blackboard platforms can securely register his data on the platform by sending a confirmation message via his mobile phone, and then the student deals with confidence and security with the content of the platform.
- The user in both edX and Blackboard platforms can easily and securely share the content of any platform, where each platform provides content protection tools, when a file has an extension (exe), for example, it is not shared with any other user.
- In case the user loses or forgets the password, EdX and Blackboard provide accurate password recovery tools through the user's mobile number, or by sending a message to the platform manager to verify the identity of the student. Therefore, all students on edX and Blackboard platforms feel safe and confident in dealing with any of these platforms.

#### i.SCIENTIFIC AND PRACTICAL SIGNIFICANCE OF THE RESEARCH FINDINGS

Through tables (3, 4), the researchers explain the practical or applied importance of the research findings by finding the effect size of the independent variable on the dependent variables.

**Table 5. The scientific and applied significance of the research findings**

Independent variable	Dependent variable	Cohen's (d)	$\eta^2$	Effect size
Edx integration with AI Apps	Education engagement	2.13	0.53	Big
	Digital trust	0.29	0.03	Small

It is clear from Table (5) that the size of the effect of the engagement of the Digital edX platform with artificial intelligence applications in the development of engagement skills in learning the course “Using Computers in Education” among students of the College of Education, King Khalid University (0.53), which is a large percentage. The rest is due to a variety of other factors, including specialization, student experience, student environment, peers, and other factors. As for the size of the effect of using edX Digital platform with artificial intelligence applications on the development of digital trust skills, it was (0.03), which is a small size.



## DISCUSSING THE RESEARCH FINDINGS

The current research aims to develop engagement skills and digital trust in the course “Using Computers in Education” among students at the College of Education, King Khalid University by designing a learning environment based on the engagement of the Digital platform (EdX) with some applications of artificial intelligence.

First: What is the effect of the integration between the Digital edX platform and artificial intelligence applications on the development of engagement skills in learning among students at the College of Education, King Khalid University?

The findings showed that the ability of the students of the first empirical group that used edX platform was higher and statistically significant than the ability of the students of the second group that used “Blackboard” platform in developing engagement skills in learning. This means that the students of the first empirical group benefited from edX platform and artificial intelligence applications better than the students who trained through “Blackboard” platform. This may be due to the employment of artificial intelligence applications within edX platform and giving the learner the ability to share information with others. Moreover, the user interface of edX platform facilitated the engagement of students into the learning process anywhere and at any time. This result is consistent with the findings of the study of [6], and the study of [7].

Second: What is the effect of the integration between the Digital edX platform and artificial intelligence applications in developing digital trust skills among students at the College of Education, King Khalid University?

The findings showed that the ability of the students of the first empirical group that used edX platform was almost equal to the ability of the students of the second group that used “Blackboard” platform in digital trust skills. This means that the students of the first empirical group benefited from edX platform and artificial intelligence applications almost to the same extent as the students who trained through “Blackboard” platform. This may be because both edX and Blackboard platforms each provide a secure system for entering the platform, as well as the ability to verify the user's identity when changing the password. EdX and Blackboard platforms also provide safe handling without fear on mobile phones, as well as through them the learner can share files safely without fear. All of this led to the equal role of edX and Blackboard platforms in developing digital trust skills among students of the College of Education, King Khalid University.

## RESEARCH RECOMMENDATIONS

1. Based on the current research findings, the following can be recommended:
  - The need to pay attention to training university students on digital engagement skills through global e-learning platforms such as: EdX, Coursera.





- The need to pay attention to developing the skills of university faculty members on ways to employ artificial intelligence applications in the field of education.
- The need to pay attention to the design of courses through Digital platforms; Research encourages educational inclusion and digital trust.
- The need to pay attention to the engagement of artificial intelligence applications in interactive Digital platforms.

## SUGGESTED RESEARCH

In light of the research findings, some of the following research can be suggested:

- A proposed training program based on e-learning platforms to develop digital entrepreneurship and decision-making skills among university students.
- Designing an e-learning environment based on “design thinking” to develop digital intelligence skills and design digital platforms among College of Education’s students.
- The effect of using artificial intelligence applications on developing digital transformation skills, technological thinking, and future foresight among university students.

## CONFLICT OF INTEREST

The authors declare that there is no conflict regarding the publication of this paper.

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